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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

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Introduction

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Each entry in the publication consists of a standard bibliographic citation accompanied, in most cases, by an abstract.

Two indexes—subject and author are included.

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Appendix

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Typical Report Citation and Abstract

DOCUMENT ID NUMBER → **19960021053** NASA Langley Research Center, Hampton, VA USA. ← **CORPORATE SOURCE**

TITLE → **An Extended Compact Tension Specimen for Fatigue Crack Propagation and Fracture**

AUTHORS → Piascik, R. S., NASA Langley Research Center, USA; Newman, J. C., Jr., NASA Langley Research Center, USA; ← **AUTHORS' AFFILIATION**

PUBLICATION DATE → Mar. 1996, pp. 16; In English

CONTRACTS/GRANTS → Contract(s)/Grant(s): RTOP 538–02–10–01

REPORT NO.(S) → Report No.(s): NASA–TM–110243; NAS 1.15:110243; No Copyright; Avail: CASI A03, Hardcopy; A01, Microfiche ← **AVAILABILITY AND PRICE CODE**

ABSTRACT → An extended compact tension specimen, EC(T) has been developed for fatigue and fracture testing. Documented herein are stress-intensity factor and compliance expressions for the EC(T) specimen.

ABSTRACT AUTHOR → Author

SUBJECT TERMS → *Crack Propagation; Stress Intensity Factors; Fatigue (Materials)*

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 426)

NOVEMBER 12, 1996

51
LIFE SCIENCES (GENERAL)

19960045744 Department of Energy, Office of Energy Research, Division of Energy Biosciences, Washington, DC USA

Division of energy biosciences: Annual report and summaries of FY 1995 activities ***Annual Report***

Apr. 1996; 193p; In English

Report No.(s): DOE/ER-0676; DE96-010341; No Copyright; Avail: CASI; A09, Hardcopy; A03, Microfiche

The mission of the Division of Energy Biosciences is to support research that advances the fundamental knowledge necessary for the future development of biotechnologies related to the Department of Energy's mission. The departmental civilian objectives include effective and efficient energy production, energy conservation, environmental restoration, and waste management. The Energy Biosciences program emphasizes research in the microbiological and plant sciences, as these understudied areas offer numerous scientific opportunities to dramatically influence environmentally sensible energy production and conservation. The research supported is focused on the basic mechanisms affecting plant productivity, conversion of biomass and other organic materials into fuels and chemicals by microbial systems, and the ability of biological systems to replace energy-intensive or pollutant-producing processes. The Division also addresses the increasing number of new opportunities arising at the interface of biology with other basic energy-related sciences such as biosynthesis of novel materials and the influence of soil organisms on geological processes.

DOE

Biomass; Biotechnology; Microbiology; Plants (Botany); Research Projects; Biosynthesis

19960045787 Bionetics Corp., Cocoa Beach, FL USA

Further Characterization of CELSS Wastes: A Review of Solid Wastes Present to Support Potential Secondary Biomass Production ***Final Report***

Muller, Matthew S., Bionetics Corp., USA; Jun. 1996; 30p; In English

Contract(s)/Grant(s): NAS10-11624

Report No.(s): NASA-TM-111677; NAS 1.15:111677; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Controlled ecological life support systems (CELSS) may one day play an essential role in extraterrestrial colonies. Key to the success of any CELSS will be the system's ability to approach a self-supporting status through recovery and reuse of basic resources. Primary CELSS solid wastes with potential to support secondary biomass production will be inedible plant biomass and metabolic human wastes. Solid waste production is summarized and reported as 765 g N per day per person, including 300 g C and 37 g N per day per person. One Resource Recovery configuration using the bioprocessing of solid wastes into a Tilapia feed stream is examined. Based on estimated conversion efficiencies, 12 g of protein per day per person is produced as a nutrition supplement. The unique tissue composition of crops produced at the Kennedy Space Center CELSS Program highlights the need to evaluate Resource Recovery components with data generated in the CELSS environment.

Author

Closed Ecological Systems; Solid Wastes; Biomass; Bioprocessing; Ecosystems; Human Wastes; Metabolic Wastes; Aerospace Environments

19960045788 NASA Ames Research Center, Moffett Field, CA USA

Intramuscular Pressure Measurement During Locomotion in Humans

Ballard, Ricard E., NASA Ames Research Center, USA; Aug. 1996; 24p; In English

Contract(s)/Grant(s): RTOP 199-14-12-04; RTOP 199-26-12-38

Report No.(s): NASA-TM-110412; A-962341; NAS 1.15: 110412; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

To assess the usefulness of intramuscular pressure (IMP) measurement for studying muscle function during gait, IMP was recorded in the soleus and tibialis anterior muscles of ten volunteers during, treadmill walking, and running using transducer-tipped catheters. Soleus IMP exhibited single peaks during late-stance phase of walking (181 +/- 69 mmHg, mean +/- S.E.) and running (269 +/- 95 mmHg). Tibialis anterior IMP showed a biphasic response, with the largest peak (90 +/- 15 mmHg during walking and 151 +/- 25 mmHg during

running) occurring shortly after heel strike. IMP magnitude increased with gait speed in both muscles. Linear regression of soleus IMP against ankle joint torque obtained by a dynamometer in two subjects produced linear relationships (r = 0.97). Application of these relationships to IMP data yielded estimated peak soleus moment contributions of 0.95-165 Nm/Kg during walking, and 1.43-2.70 Nm/Kg during running. IMP results from local muscle tissue deformations caused by muscle force development and thus, provides a direct, practical index of muscle function during locomotion in humans. Author

Muscular Function; Locomotion; Human Body; Muscles; Physiological Tests

19960047457 California Univ., Dept. of Physiological Sciences., Los Angeles, CA USA

Muscle Feasibility for Cosmos Rhesus *Final Report, 1 May 1988 - 30 Sep. 1994*

Edgerton, V. Reggie, Principal Investigator, California Univ., USA; Roland, Roy R., California Univ., USA; Hodgson, John A., California Univ., USA; Sep. 30, 1994; 17p; In English

Contract(s)/Grant(s): NCC2-535

Report No.(s): NASA-CR-202123; NAS 1.26:202123; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The following tasks were proposed for the Cosmos project: 1) Complete recordings of all preflight candidates during performance of a foot pedal motor control task while in the space capsule mock-up. 2) Complete recordings of all preflight candidates during locomotion and postural tasks. 3) Complete recordings of 24-hour spontaneous cage activity in the two flight monkeys before and after flight and of at least three control (non-flight) monkeys after the flight has been completed. 4) Complete recordings of the foot pedal and motor control tasks during flight and postflight as scheduled. 5) Complete recordings of the vertical drop test pre, during and postflight for the two flight and three control monkeys. 6) Complete recordings of locomotion and posture tests of the two flight monkeys postflight. 7) Complete recordings of locomotion and postural tests of at least three control (non-flight) monkeys during the postflight period. 8) Recalibrate buckles of the two flight and of at least three control monkeys postflight. 9) Complete analysis of the 24 hour EMG recordings of all monkeys. 10) Complete analysis of the foot pedal, locomotor and postural motor control tasks for the two flight and three control monkeys. It was proposed that efforts in the first postflight year be concentrated on the two flight animals and three postflight animals. Author

Psychomotor Performance; Electromyography; Muscles; Posture; Drop Tests; Monkeys; Exercise Physiology; Locomotion

19960047478 Iowa Univ., Depts. of Psychology. Pharmacology and the Cardiovascular Center., Iowa City, IA USA

Chemical Topography of Efferent Projections from the Median Preoptic Nucleus to Pontine Monoaminergic Cell Groups in the Rat

Zardetto-Smith, Andrea M., Iowa Univ., USA; Johnson, Alan Kim, Iowa Univ., USA; Aug. 31, 1995; 6p; Repr. from Neuroscience Letters (Elsevier Science Ireland, Ltd.), v.199, 1995 p 215-219; In English

Contract(s)/Grant(s): NAGW-4358

Report No.(s): NASA-CR-201819; NAS 1.26:201819; Copyright Waived (NASA); Avail: CASI; A02, Hardcopy; A01, Microfiche

This study examined efferent output from the median preoptic nucleus (MNPO) to pontine noradrenergic and serotonergic cell groups using an anterograde tracing technique (Phaseolus vulgaris leucoagglutinin, PHA-L) combined with glucose oxidase immunocytochemistry to serotonin (5-HT) or to dopamine-beta-hydroxylase (DBH). Injections of PHA-L into the ventral MNPO resulted in moderate axonal labeling within the region of the B7 and B8 serotonergic groups in the dorsal raphe. PHA-L labeled fibers and punctate processes were observed in close apposition to many of the 5-HT immunoreactive neurons in these regions. In contrast, sparse terminal labeling was found within the B5 group in the raphe pontis nucleus, and only trace fiber labeling observed in the B3 and B6 groups. Efferents from the MNPO also provided moderate innervation to the A6 and A7 noradrenergic groups. PHA-L labeled punctate processes were found most frequently in close apposition to DBH-immunoreactive neurons at mid- to caudal levels of the locus coeruleus. Some labeled axons were also present within the A7 and A5 groups. Additionally, a close apposition between labeled MNPO efferents and 5-HT fibers within the lateral parabrachial nucleus was observed. The results indicate the MNPO provides a topographic innervation of monoaminergic groups in the upper brainstem. Author

Cells (Biology); Serotonin; Brain; Nuclei (Cytology)

19960047530 San Jose State Univ., CA USA

NASA Rat Acoustic Tolerance Test 1994-1995: 8 kHz, 16 kHz, 32 kHz Experiments *Final Report*

Mele, Gary D., San Jose State Univ., USA; Holley, Daniel C., San Jose State Univ., USA; Naidu, Sujata, San Jose State Univ., USA; Jan. 30, 1996; 65p; In English

Contract(s)/Grant(s): NCC2-822

Report No.(s): NASA-CR-202117; NAS 1.26:202117; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Adult male Sprague-Dawley rats were exposed to chronic applied sound (74 to 79 dB, SPL) with octave band center frequencies of either 8, 16 or 32 kHz for up to 60 days. Control cages had ambient sound levels of about 62 dB (SPL). Groups of rats (test vs. control; N=9 per group) were euthanized after 0. 5. 14, 30, and 60 days. On each euthanasia day, objective

evaluation of their physiology and behavior was performed using a Stress Assessment Battery (SAB) of measures. In addition, rat hearing was assessed using the brain stem auditory evoked potential (BAER) method after 60 days of exposure. No statistically significant differences in mean daily food use could be attributed to the presence of the applied test sound. Test rats used 5% more water than control rats. In the 8 kHz and 32 kHz tests this amount was statistically significant(P less than .05). This is a minor difference of questionable physiological significance. However, it may be an indication of a small reaction to the constant applied sound. Across all test frequencies, day 5 test rats had 6% larger spleens than control rats. No other body or organ weight differences were found to be statistically significant with respect to the application of sound. This spleen effect may be a transient adaptive process related to adaptation to the constant applied noise. No significant test effect on differential white blood cell counts could be demonstrated. One group demonstrated a low eosinophil count (16 kHz experiment, day 14 test group). However this was highly suspect. Across all test frequencies studied, day 5 test rats had 17% fewer total leukocytes than day 5 control rats. Sound exposed test rats exhibited 44% lower plasma corticosterone concentrations than did control rats. Note that the plasma corticosterone concentration was lower in the sound exposed test animals than the control animals in every instance (frequency exposure and number of days exposed).
Author
Adaptation; Noise (Sound); Brain Stem; Rats; Body Weight; Hearing; Auditory Fatigue; Stress (Physiology)

19960047789 Massachusetts Inst. of Tech., Cambridge, MA USA
Some Nonlinear Problems in Plankton Ecology
Pascual-Dunlap, Maria Mercedes, Massachusetts Inst. of Tech., USA; Jun. 1995; 177p; In English
Contract(s)/Grant(s): N00014-92-J-1527
Report No.(s): AD-A305897; MIT/WHOI-95-15; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

In marine ecology, the variability of the physical environment is often considered a main determinant of biological pattern. A common approach to identifying key environmental forcings is to match scales of variability: fluctuations of a biological variable at a particular frequency are attributed to forcing by the physical environment at a similar frequency. In nonlinear systems, however, different scales of variability interact and forcing at one scale can produce variability at a different scale. The general theme of this dissertation regards the interplay of scales in nonlinear ecological systems, with an emphasis on the mismatch of scales between biological variables and environmental forcings in the plankton. I use simple models to identify conditions leading to such a mismatch. The models focus on one ubiquitous nonlinear ecological interaction, that between a consumer and a resource. I consider: first, the interaction between a phytoplankton population and a limiting nutrient resource; second, the interaction of a predator and a prey that diffuse along an environmental gradient. I demonstrate two novel scenarios leading to scales of plankton variability different from those of the e nvironment. I end by considering another consequence of the transfer of variability in nonlinear systems: the lack of a dominant scale.
DTIC
Nonlinear Systems; Ecology; Ecosystems; Marine Environments; Phytoplankton; Plankton

19960047817 Massachusetts Inst. of Tech., Cambridge, MA USA
Mutant Analysis of Luminescence and Autoinduction in a Marine Bacterium
Kuo, Alan, Massachusetts Inst. of Tech., USA; Feb. 1995; 85p; In English
Contract(s)/Grant(s): NSF-MCB91-04653
Report No.(s): AD-A305899; MIT/WHOI-95-11; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The marine symbiotic bacterium Vibrio fischeri is striking for its ability both to emit light and to dramatically regulate light emission using a cell-to-cell signalling mechanism called autoinduction. The latter is mediated by a signal molecule called the 'autoinducer'. The mechanistic bases of both luminescence and autoinduction are well known in V. fischeri, but this knowledge is mostly derived from studies of the cloned luminescence and autoinduction genes expressed in Escherichia coli. In this study, luminescence and autoinduction mutations were systematically generated in V. fischeri to explore aspects of luminescence and autoinduction not addressable in E. coli, such as the adaptive significance of luminescence. Most dramatically, the mutants revealed the presence of multiple autoinducers and autoinducer synthases in V. fischeri. One of the autoinducers (autoinducer-2, or AI-2) was chemically purified and shown to be N-octanoyl-L-homoserine lactone. The genetic locus encoding the AI-2 synthase was cloned and designated ain (autoinducer). Manipulation of ain and AI-2 in V. fisclieri demonstrated that the function of AI-2 appears to be to inhibit rather than to promote autoinduction.
DTIC
Bacteria; Light Emission; Luminescence; Genetics; Genes

19960047821 Brooke Army Medical Center, Fort Sam Houston, TX USA
Blood Amplification: Use of Phosphoenolpyruvate (PEP) Treated Red Blood Cell Transfusions in the Dog (Canis familiaris) ***Final Report, 3 Aug. 1994 - 29 Feb. 1995***
Cornum, Rhonda L. S., Brooke Army Medical Center, USA; Feb. 1996; 19p; In English
Report No.(s): AD-A306015; No Copyright; Avail: Issuing

Activity (Defense Technical Information Center (DTIC)), Microfiche

Theoretically, decreasing hemoglobin oxygen affinity (HOA) of red blood cells (RBC) prior to transfusion should augment oxygen consumption during anemic hypoxia. Incubation of RBCs with phospenolpyruvate (PEP) increases 2,3-DPG and decreases HOA. This study evaluated the effect of transfusion with PEP treated RBCs on cardiovascular compensation and oxygen consumption in acutely anemic dogs.
DTIC

Hemoglobin; Cardiovascular System; Blood; Oxygen Consumption; Transfusion; Erythrocytes; Oxygen

19960047996 NASA Washington, Washington, DC USA
Quantification of Bone Growth Rate Variability in Rats Exposed to Micro- (near zero G) and Macrogravity (2G) ***Annual Report***
Bromage, Timothy G., Hunter Coll., USA; Doty, Stephen B., Hospital for Special Surgery, USA; Smolyar, Igor, Hunter Coll., USA; Holton, Emily, NASA Washington, USA; 1996; 9p; In English
Contract(s)/Grant(s): IRP-95-101
Report No.(s): NASA-CR-202210; NAS 1.26:202210; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Our stated primary objective is to quantify the growth rate variability of rat lamellar bone exposed to micro and macrogravity (2G). The primary significance of the proposed work is that an elegant method will be established that unequivocally characterizes the morphological consequences of gravitational factors on developing bone. The integrity of this objective depends upon our successful preparation of thin sections suitable for imaging individual bone lamellae, and our imaging and quantitation of growth rate variability in populations of lamellae from individual bone samples.
Author

Physiological Responses; Gravitational Effects; Bones; Imaging Techniques; Growth; Lamella

19960048012 Commissariat a l'Energie Atomique, Fontenay-aux-Roses, France
Contribution of fluorescence in situ hybridization to biological dosimetry
Sorokine-Durm, I., Commissariat a l'Energie Atomique, France; Roy, L., Commissariat a l'Energie Atomique, France; Durand, V., Commissariat a l'Energie Atomique, France; Voisin, P., Commissariat a l'Energie Atomique, France; 1995; 4p; In English; Conference on Radiation Protection and Medicine, 28-30 Jun. 1995, Montpellier, France
Report No.(s): CEA-CONF-12303; CONF-950688-; DE96-626989; No Copyright; Avail: Issuing Activity (Department of Energy (DOE)) (US Sales Only), Microfiche

Fluorescence in situ hybridization with composite whole chromosome specific DNA probes for human chromosomes 2, 4 and 12 an (alpha)-satellite centromeric DNA probe labelled with biotin were used to measure symmetrical and terminal translocations (dose rate 0.5 Gy/min) and dicentrics (0.1 Gy/min) induced in vitro by (sup 60)Co (gamma)-irradiation (0-5 Gy). The suitability of fluorescence in situ hybridization (F.I.S.H.) technique for dicentrics detection is compared with the conventional technique. Dose-response curves for (gamma)-rays ((sup 60)Co) for two dose rates are shown (dicentrics and translocations).
DOE

Biotin; Dosimeters; Resonance Fluorescence; Chromosomes; Dosage; Gene Expression; Spectroscopy

19960048239 Wisconsin Univ.-Parkside, Biomedical Research Institute, Kenosha, WI USA
Weak Electromagnetic Field Effects on Gene Expression in E. coli
Goodman, E. M., Wisconsin Univ.-Parkside, USA; Greenebaum, B., Wisconsin Univ.-Parkside, USA; Mar. 12, 1996; 10p; In English
Contract(s)/Grant(s): N00014-90-J-1669
Report No.(s): AD-A306447; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

We have previously shown that exposing Escherichia coli to a magnetic fields (MFs) increased the levels of some proteins and decreased others. Using a cell-free system we reported that expression (transcription and/or translation) of the alpha and beta(beta) subunits of DNA-directed RNA polymerase were elevated following exposure to 45 Hz, 1.1, 0.21 and 0.07 mT magnetic fields. In the last phase of this program, we sought to determine whether transcription and/or translation were altered by MFs. A cell-free E. coli system was used to determine whether or not MFs directly affect the translational or translational processes. Our data suggest that MFs have no significant direct effect on either transcription or translation. In contrast, when a eukaryotic HeLa extract containing a cmyc plasmid was exposed to a magnetic field, enhanced transcription was observed. At this time we conclude that our inability to distinguish differences in transcription and translation in E. coli may be related to the coupled nature of these processes in the bacterial system.
DTIC

Electromagnetic Fields; Gene Expression; Deoxyribonucleic Acid; Bacteria

19960051514
Electron paramagnetic resonance study of arthritic joints
Naughton, D. P., London Hospital Medical Coll, UK; Gaffney, K.; Grootveld, M. C.; Blake, D. R.; Nazhat, N. B.; Symons, M. C. R.; Rhodes, C. J.; Journal of Materials Science Letters; September 1 1996; ISSN 0261-8028; vol. 15, no. 17, pp. 1520-1522; In English; Copyright; Avail: Issuing Activity

The present study employed low-temperature electron paramagnetic resonance (EPR) spectroscopy to investigate the presence of paramagnetic species in isolated synovium

and bone from patients suffering from rheumatoid and osteoarthritis. The EPR profiles of samples of normal bone and synovium obtained during traumatic injury surgery were employed as controls.
Author (EI)
Diseases; Joints (Anatomy); Low Temperature; Paramagnetic Resonance; Spectroscopy; Temperature Effects

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19960045715 California Univ., Davis, CA USA
The Effects of Hypergravic Fields on Neural Signalling in the Hippocampus ***Final Report***
Horowitz, John, California Univ., USA; Horwitz, Barbara, California Univ., USA; [1991]; 96p; In English
Contract(s)/Grant(s): NAG2-341
Report No.(s): NASA-CR-201825; NAS 1.26:201825; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The goal of this grant is to study the effect of hypergravic fields on the modulation of hippocampal electrical activity by serotonin (5-HT). The proposed study represents a shift from our previous NASA grants covering three diverse areas in neurobiology (thermoregulation, vestibular and auditory brainstem evoked responses, and the hippocampus) to consideration of only one of these areas, the hippocampus. to place our proposed hippocampal experiments in context with relevant Spacelab-3 experiments and hypergravic experiments, two experiments on receptor changes in animals exposed to altered gravitational fields are first described. Our experiments build on these structural/biochemical observations and extend investigations to related electrical activity at 1 G and in hypergravic fields. The background continues with a review of past studies at 1G related to effects of serotonin on hippocampal electrical activity (i.e., population spikes, intracellular potentials).
Derived from text
Hippocampus; Gravitational Fields; Serotonin; Receptors (Physiology); Biological Effects; Gravitational Effects; Neurophysiology

19960045766 Texas Univ., Medical Branch, Dept. of Otolaryngology, Galveston, TX USA
Basic Gravitational Reflexes in the Larval Frog ***Final Report, 1 Jan. 1992 - 31 Aug. 1996***
Cochran, Stephen L., Texas Univ., USA; Aug. 31, 1996; 4p; In English
Contract(s)/Grant(s): NAG2-780
Report No.(s): NASA-CR-202154; NAS 1.26:202154; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

This investigation was designed to determine how a primitive vertebrate, the bullfrog tadpole, is able to sense and process gravitational stimuli. Because of the phylogenetic similarities of the vestibular systems in all vertebrates, the understanding of the gravitational reflexes in this relatively simple vertebrate should elucidate a skeletal framework on a elementary level, upon which the more elaborate reflexes of higher vertebrates may be constructed. The purpose of this study was to understand how the nervous system of the larval amphibian processes gravitational information. This study involved predominantly electrophysiological investigations of the isolated, alert (forebrain removed) bullfrog tadpole head. The focus of these experiments is threefold: (1) to understand from whole extraocular nerve recordings the signals sent to the eye following static gravitational tilt of the head; (2) to localize neuronal centers responsible for generating these signals through reversible pharmacological ablation of these centers; and (3) to record intracellularly from neurons within these centers in order to determine the single neuron's role in the overall processing of the center. This study has provided information on the mechanisms by which a primitive vertebrate processes gravitational reflexes.
Derived from text
Electrophysiology; Vertebrates; Nervous System; Neurophysiology; Eye (Anatomy); Physiological Responses; Gravitational Effects

19960047258 China Nuclear Information Centre, Beijing, China
Study on the metabolic peculiarities of renal radiotracer Tc-99m - PAHIDA and diagnostic use
Zhu Shoupeng, Suzhou Medical Coll., China; Wang Liuyi, Suzhou Medical Coll., China; Lun Mingyue, Suzhou Medical Coll., China; Nov. 1994; 13p; In Chinese
Report No.(s): CNIC-00916; SMC-0112.; DE96-622087; Copyright; Avail: Issuing Activity (Department of Energy (DOE)) (US Sales Only), Microfiche

The metabolic peculiarities of renal radiotracer Tc-99m - PAHIDA and diagnostic use were studied. The results of the radioactive tracing study showed that Tc-99m - PAHIDA was distributed predominantly in kidney, and then in heart, gastrointestinal tract, liver, spleen, musculus quadriceps femoris, adipose tissue, testes and brain. It should be noted that when smaller dose of this agent was given, more Tc-99m - PAHIDA was concentrated in kidney and, at the same time, the level of its binding to plasma protein was lower. The experimental results indicated that Tc-99m - PAHIDA was rapidly excreted in urine. Autoradiochromatographic examination of the urine showed a single radioactive peak corresponding to the authentic Tc-99m - PAHIDA, indicating that Tc-99m - PAHIDA was excreted in the unchanged form.
DOE

Metabolism; Kidneys; Liver; Proteins; Radioactivity; Medical Science

19960047278 Mitsubishi Research Inst., Inc., Tokyo, Japan
NASDA Contract Report. Report of Investigation of Manned Space Technology, Space Medicine and Human Science: Cardiovascular System
Mar. 1996; 100p; In English
Report No.(s): NASDA-CNT-950071T; Copyright; Avail: Issuing Activity (Natl Space Development Agcy. of Japan (NASDA)), Hardcopy, Microfiche

The purpose of this survey is to identify future research subjects for understanding how the human cardiovascular system will be affected in space, for elucidating these mechanisms and for employing useful countermeasures. The following nine sub-subjects are studied: (1) Study of human cardiovascular system in space, (2)Parabolic flight and the cardiovascular system, (3) Water immersion and cardiovascular system, (4) Head-down tilting, (5) Standing load, (6) Lower body negative pressure, (7) Cardiovascular deconditioning induced by staying in space and countermeasure drugs, (8) Effects of exercise on the cardiovascular system, and (9) Artificial gravity. In each subsection, the accumulated scientific knowledge was reviewed, problems were classified, and topics were chosen for future research.
Derived from text
Aerospace Medicine; Cardiovascular System; Lower Body Negative Pressure; Parabolic Flight; Physical Exercise; Water Immersion; Deconditioning; Microgravity Applications

19960047358 NASA Langley Research Center, Hampton, VA USA
Method of and Apparatus for Histological Human Tissue Characterization Using Ultrasound
Yost, William T., Inventor, NASA Langley Research Center, USA; Cantrell, John E., Inventor, NASA Langley Research Center, USA; Taler, George, Inventor, Maryland Univ., USA; Jan. 26, 1996; 20p; In English
Patent Info.: NASA-Case-LAR-15040-1; US-Patent-Appl-SN-592833
Report No.(s): NAS 1.71:LAR-15040-1; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The present invention relates generally to the medical classification of human tissue as healthy or unhealthy. More specifically, the invention uses ultrasound for determining histological characteristics of tissue by converting the return energy pulses into numerical terms, thus facilitating a quantitative analysis for medical diagnosis. A method and apparatus for determining important histological characteristics of tissue, including a determination of the tissue's health. Electrical pulses are converted into meaningful numerical representations through the use of Fourier Transforms. These numerical representations are then used to determine important histological characteristics of tissue. This novel invention does not require rectification and thus provides for detailed information from the ultrasonic scan.
NASA
Ultrasonics; Tissues (Biology); Histochemical Analysis; Characterization; Ultrasonic Tests

19960047364 Armstrong Lab., Brooks AFB, TX USA
Outline of Neuropsychiatry in Aviation Medicine 2 ***Interim Report, 1940-1995***
McGlohn, Suzanne E., Armstrong Lab., USA; King, Raymond E., Armstrong Lab., USA; Patterson, John C., Armstrong Lab., USA; Dec. 1995; 37p; In English
Contract(s)/Grant(s): AF Proj. 7755
Report No.(s): AD-A305300; AL/AO-TR-1995-0191; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This manual discusses issues in psychiatry and psychology unique to aerospace medicine including: psychiatric disease in the aviator, selection of aircrew and astronauts, fear of flying, and the personality of the successful aviator. This manual addresses issues not emphasized in the typical psychiatry or psychology text, specifically airsickness, combat stress, aircrew fatigue management, prisoner-of-war experiences, and sequelae of aviation mishaps (accidents). Other issues in psychiatry and psychology, which are not fundamentally different from those encountered in everyday civilian and military practice, are not addressed in detail here but are dealt with in many widely available textbooks.
DTIC
Aerospace Medicine; Aircraft Accidents; Neuropsychiatry; Flight Crews; Psychology

19960047395 Naval Postgraduate School, Monterey, CA USA
Note on an Alternative Mechanism for Logistic Growth
Gaver, Donald P., Naval Postgraduate School, USA; Jacobs, Patricia A., Naval Postgraduate School, USA; Carpenter, Robert L., Naval Postgraduate School, USA; Nov. 1995; 21p; In English
Report No.(s): AD-A304510; NPS-OR-95-013; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Populations of cells that make up organ tissue grow and contract. A traditional approach to modeling organ size restriction to an observed 'normal' level is to postulate a physical carrying capacity: effectively a limit on the physical region that can be occupied by the organ. The purpose of this note is to provide a very simple model for a cell population that grows under the control of positive and negative growth factors. It will be seen that such a model can result in logistic growth without the necessity of postulating a physical carrying capacity.
DTIC
Organs; Cells (Biology); Size (Dimensions); Populations; Capacity; Growth

19960047409 Arizona Univ., Tucson, AZ USA
1st InterNational Conference on the Molecular Genetics and Pathogenesis of the Clostridia ***Final Report, 15 N0v. 1994 - 14 Nov. 1995***
Songer, J. G., Arizona Univ., USA; Dec. 1995; 4p; In English; 1st, 14 Nov. 1995, Tuscon, AZ, USA
Contract(s)/Grant(s): DAMD17-95-1-5010
Report No.(s): AD-A304399; No Copyright; Avail: CASI; A01, Hardcopy; A01, Microfiche

Recent increases in the understanding of clostridial genetics and pathogenesis prompted the planning of the First InterNational Conference on the Molecular Genetics and Pathogenesis of the Clostridia. The specific aims of the Conference were to provide a centralized, broad-based forum on new developments, with particular emphasis on molecular biology, to encourage new insights, especially the identification of common themes in dostridial genetics and pathogenesis, to help train the next generation of dostridial researchers, to bring together basic and clinical scientists, stimulating the development of new ideas, perspectives, and collaborations, and to encourage reactivation of interest by the veterinary community in dostridial disease. Overall, the conference included 82 talks and posters, presented in eight oral and two poster sessions. Dr. Madelaine Sebald presented the keynote address The Development of Clostridial Genetics'. The oral sessions included 'Clostridia in Clinical Practice,' 'Genome Organization and Molecular Genetics,' 'Membrane-Active Toxins and Enzymes,' 'Neurotoxins,' Enterotoxins, 'Host-Pathogen Interactions,' 'Regulation of virulence,' - and 'Prophylaxis, Therapy and Diagnosis.' There were also two afternoon poster sessions, which complemented the oral sessions. Overall, the conference was well received by both participants and organizers.
DTIC
Conferences; Molecular Biology; Pathogenesis; Enzymes; Membranes; Pathogens; Toxins and Antitoxins; Virulence; Genetics

19960047574 Brooke Army Medical Center, Dept. of Clinical Investigation., Fort Sam Houston, TX USA
Clinical Investigation Program Report TCS MED-3OO(R1), volume 1 ***Annual Report***
Longfield, Jenice N., Brooke Army Medical Center, USA; Aguero, Lynda D., Brooke Army Medical Center, USA; Oct. 1995; 465p; In English
Report No.(s): AD-A306902; BAMC-TCS-MED-300-VOL-1; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Subject report identifies the research activities conducted by Brooke Army Medical Center investigators through protocols approved by the Clinical Investigation Committee, the Institutional Review Board, and the Animal Use Committee for registration with the Department of Clinical Investigation during Fiscal Year 1995, and known publications and presentations by the Brooke Army Medical Center professional staff. A detail sheet of each protocol giving the objective, technical approach and progress is presented.
DTIC
Protocol (Computers); Clinical Medicine; Animals; Medical Services

19960047741 Army Aeromedical Research Lab., Fort Rucker, AL USA
Injury risk for research subjects with spina bifida occulta in a repeated impact study: A case review ***Final Report***
Albano, John P., Army Aeromedical Research Lab., USA; Shannon, Samuel G., Army Aeromedical Research Lab., USA; Alem, Nabih M., Army Aeromedical Research Lab., USA; Mason, kevin T., Army Aeromedical Research Lab., USA; Jan. 1996; 13p; In English
Contract(s)/Grant(s): DAMD17-91-C-1115; 3O162787A878
Report No.(s): AD-A304632; USAARL-96-05; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Spina Bifida Occulta (SBO) occurs in 18-34% of the normal U. S. population. Recently, 16.5% of normal, asymptomatic male soldier volunteer candidates in a U.S. Army Aeromedical Research Laboratory ride motion study were excluded from the study because they had SBO at one vertebral level. Disqualifying this percentage of screened research subject candidates threatened the timely completion of the schedule intense protocol. Although one study suggests that SBO at spinal level 51 has a higher incidence of posterior disc herniation, the preponderance of clinical literature reports that spina bifida occulta is not a medical problem. The impact literature indicates that lumbosacral verteb ral bodies fracture at 7.14 kN in static compression and 20 plus g during dynamic vertical impacts. In this paper, we examined the human data observed in ejection seat incidents, the rationale for excluding volunteers with single level SBO, and the path of axial load transmission through the lumbosacral spine. Based on the findings, we concluded that research volunteers with single level SBO are not at increased risk for injury, and recommended inclusion of these volunteers in future studies involving repeated axial impacts due to ride motion.
DTIC
Aerospace Medicine; Injuries; Wound Healing; Spine; Spinal Cord; Congenital Anomalies; Clinical Medicine

19960047745 Oak Ridge National Lab., TN USA
Environmental Risk Assessments Based on Bone Marrow Cell Kinetic
Jones, Troyce D., Oak Ridge National Lab., USA; Morris, Max D., Oak Ridge National Lab., USA; Hasan, Jafar S., Oak Ridge National Lab., USA; Feb. 1996; 132p; In English
Contract(s)/Grant(s): DNA-IACRO-93-844
Report No.(s): AD-A304581; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

Risk of acute mortality from ionizing radiations, leukemia, and cancer are modeled for exposures to X-rays, photons, fission-produced neutrons, and neutrons produced by thermonuclear processes. Risks from protracted exposures are evaluated in terms of sublethal injury to cells, repair of sublethal injury, I-hit cell killing, killing of cells having unrepaired sublethal injury, and radiation-induced cellular repopulation. These cellular effects can be used to equate the protracted exposure to a prompt or pulse exposure of a reference radiation such as through a calculated value for the Equivalent Prompt Dose (EPD). Model coefficients are given for hematopoietic stem cells, marrow stromal cells, and four representative line of human leukemia and lymphoma cells. A user-friendly, menu-driven, personal computer executable file named MarCell (for marrow cell) is included with this report.
DTIC
X Rays; Cells (Biology); Leukemias; Radiation Effects; Bone Marrow; Hematopoietic System; Physiological Effects

19960047781 Defence and Civil Inst. of Environmental Medicine, Downsview, Ontario Canada
Evaluation of Infrared Tympanic Thermometers on Mild Hypothermic Subjects and in Cold Environments
Ducharme, M. B., Defence and Civil Inst. of Environmental Medicine, Canada; Frim, J., Defence and Civil Inst. of Environmental Medicine, Canada; Nov. 1995; 20p
Report No.(s): AD-A305847; DCIEM-95-49; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

The objective of the present study was to evaluate infrared tympanic thermometers (ITTs) on hypothermic subjects and under operationally relevant ambient conditions. Eight subjects (2 of them female) were cooled in 8-10 C water for 25 min on three ocCASIons. Tympanic temperatures obtained with three brands of ITTs (Genius, Thermoscan, and Diatek) were compared to three other core temperature estimates (esophageal, rectal, and ear canal) during the cold water immersions, and in a second series of experiments, to a temperature controlled target in cold air environments. On average, tympanic temperature (Tty) measured from the three ITT instruments was 0.99 +/- 0.18 C lower than the other core estimates. The differences between Tty and each of the three core estimates were not different, but the three differences were larger for the Genius ITT (1.49 +/- 0.36 C) compared to the two other instruments (0.63 +/- 0.21 C for Diatek; 0.63 +/- 0.20 C for Thermoscan). Furthermore, the ITT instruments failed to perform adequatly in the cold. It was concluded that tympanic temperature measured by ITT instruments underestimates core temperature during hypothermia in humans, and the ITTs can not be used below their specified operating temperature.
DTIC
Thermometers; Temperature Measuring Instruments; Infrared Radiation; Ambience; Hypothermia; Cold Water; Submerging

19960047784 InterNational Atomic Energy Agency, Vienna, Austria
Methods for estimating the probability of cancer from occupational radiation exposure
Apr. 1996; ISSN 1011-4289; 55p; In English
Report No.(s): IAEA-TECDOC-870; DE96-626991; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

The aims of this TECDOC are to present the factors which are generally accepted as being responsible for cancer induction, to examine the role of radiation as a carcinogen, to demonstrate how the probability of cancer caUSAtion by radiation may be calculated and to inform the reader of the uncertainties that are associated with the use of various risk factors and models in such calculations.
DOE
Radiation Effects; Radiation Dosage; Carcinogens; Cancer; Probability Theory; Ionizing Radiation

19960047808 Uniformed Services Univ. of the Health Sciences, Dept. of Microbiology and Immunology., Bethesda, MD USA
Regulation of Interferon Regulatory Factors in LPS-Stimulated Macrophages *Final Report, 28 May 1993 -31 Dec. 1995*
Volgel, Stefanie N., Uniformed Services Univ. of the Health Sciences, USA; Barber, Sheila A., Uniformed Services Univ. of the Health Sciences, USA; Dec. 31, 1995; 6p; In English
Contract(s)/Grant(s): MDA905-93-Z-0010
Report No.(s): AD-A305741; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Macrophages secrete interferons (IFNs), as well as other inflammatory cytokines, following stimulation with lipopolysaccharide (LPS), the outer membrane component of Gram negative bacteria that has been implicated as the initiator of the sepsis-associated Systemic Inflammatory Response Syndrome (SIRS). The interferon regulatory factors (IRFs) comprise a family of DNA binding proteins that positively and negtively regulate transcription of IFN and certain IFN-inducible genes. Basal and LPS-inducible levels of mRNA expressed by three IRF family member genes, i.e., IRF-1, IRF-2, and ICSBP, as well as a panel of other well characterized, SIRS-associated, inflammatory genes, were analyzed in macrophages derived from fully LPS-responsive mouse strains (Lps(n)), genetically LPS-hyporesponsive (Lps(d)) mice, IRF-1 and IRF-2 'knockout' mice, as well as from Lpsn macrophages rendered 'endotoxin tolerant' in vitro. Our results suggest that the IRF nuclear binding proteins, as well as serine/threonine phosphatases, play important roles in LPS-induced gene expression and may provide novel targets for

therapeutic intervention, not only in Gram negative sepsis, but also in other syndromes characterized by inflammatory mediator excess.
DTIC
Interferon; Macrophages; Deoxyribonucleic Acid; Amino Acids; Membranes; Genes; Gene Expression; Endotoxins

19960047820 Rockefeller Univ., New York, NY USA
Carboxyalkylated Crosslinked Hemoglobin as a Potential Blood Substitute ***Final Report, 15 Jun. 1994 - 31 Jan. 1996***
Manning, James M., Rockefeller Univ., USA; Mar. 1996; 28p; In English
Contract(s)/Grant(s): DAMD17-94-V-4010
Report No.(s): AD-A306017; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

Prior to preparing 128,000 cross-linked Hb, a method was devised to study subunit dissociation. A precise and rapid procedure employing gel filtration on Superose-12 to measure the tetramer-dimer dissociation constants of some natural and recombinant hemoglobins in the oxy conformation is described. Natural sickle hemoglobin was chosen to verify the validity of the results by comparing the values with those reported using an independent method not based on gel filtration. Recombinant sickle hemoglobin, as well as a sickle double mutant with a substitution at the Val-6(Beta) receptor site, had approximately the same dissociation constant as natural sickle hemoglobin. of the two recombinant hemoglobins with amino acid replacements in the alpha(1)Beta(2) subunit interface, one was found to be extensively dissociated and the other completely dissociated. In addition, the absence of an effect of the allosteric regulators DPG and IHP on the dissociation constant was demonstrated. Thus, a tetramer dissociation constant can now be readily determined and used together with other criteria for characterization of hemoglobins and their interaction with small regulatory molecules.
DTIC
Hemoglobin; Crosslinking; Blood; Substitutes; Amino Acids; Dissociation

19960047826 Army Medical Materiel Development Activity, Fort Detrick, MD USA
USA Army Medical Materiel Development Activity ***Annual Report, 1 Jan. - 31 Dec. 1995***
Lewis, George E., Jr., Army Medical Materiel Development Activity, USA; Dec. 31, 1995; 79p; In English
Report No.(s): AD-A306080; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Annual Report, Calendar Year 1995, summarizes development projects managed by the U.S. Army Medical Materiel Development Activity as authorized by The surgeon General, and the Commander, U.S. Army Medical Research and Materiel Command, and supported by RDTE funds from the Department of Defense.
DTIC
Medical Personnel; Medical Services; Clinical Medicine; Research Facilities; Laboratories; Hospitals; Military Psychology; Military Operations

19960048059 Commissariat a l'Energie Atomique, Inst. de Protection et de Surete Nucleaire., Fontenay-aux-Roses, France
Radiological accidents balance in medicine ***Bilan des accidents radiologiques en medecine***
Nenot, J. C., Commissariat a l'Energie Atomique, France; 1995; 8p; In French; Conference on Radiation Protection and Medicine, 28-30 Jun. 1995, Montpellier, France
Report No.(s): CEA-CONF-12300; CONF-950688; DE96-626988; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche; US Sales Only; US Sales Only

This work deals with the radiological accidents in medicine. In medicine, the radiation accidents on medical personnel and patients can be the result of over dosage and bad focusing of radiotherapy sealed sources. Sometimes, the accidents, if they are unknown during a time enough for the source to be spread and to expose a lot of persons (in the case of source dismantling for instance) can take considerable dimensions. Others accidents can come from bad handling of linear accelerators and from radionuclide kinetics in some therapies. Some examples of accidents are given.
DOE
Radiation Therapy; Dosage; Radiology; Medical Personnel; Patients; Exposure

19960048215 Air Force Inst. of Tech., Graduate School of Eng., Wright-Patterson AFB, OH USA
Electroencephalography: Subdural multi-electrode brain chip
Rosenstengel, John E., Air Force Inst. of Tech., USA; Dec. 1995; 84p; In English
Report No.(s): AD-A307165; AFIT/GE/ENG/95D-22; No Copyright; Avail: Issuing Activity (Department of Energy (DOE)), Microfiche

In October 1995, a CMOS brain chip consisting of two 8 x 17 multiplexed sub-arrays designed to measure electrical potentials at the cortical column level, was implanted on the somatosensory cortex of a laboratory rhesus monkey. Electroencephalograph (EEG) and averaged evoked response (AEG) data were taken over a period of 40 minutes. The brain chip was replaced with an identical chip, and data were again taken for 40 minutes. In both instances AEG signals of approximately 150 muVpp were recorded. Additionally, the first implanted chip recorded three phases of data: (1) AEG; (2) large clock noise (during a period where the chip appears to have burned the cortex); and (3) AEG-like signals of magnitude,

100 muVpp, with substantially improved signal to noise ratio. All data were taken while the monkey was under general anesthesia. The monkey was euthanized immediately after the experiments, due to a pre-existing abdominal cancer.
DTIC
Brain; Electroencephalography; Pattern Recognition; Implanted Electrodes (Biology); Physiological Tests; Chips (Electronics)

53
BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

19960047192 Crew System Ergonomics Information Analysis Center, Wright-Patterson AFB, OH USA
Handbook of Human Performance Measures and Crew Requirements for Flightdeck Research
Rehmann, Albert J., Crew System Ergonomics Information Analysis Center, USA; Dec. 1995; 95p; In English
Contract(s)/Grant(s): DLA900-88-D-0393
Report No.(s): AD-A304370; CSERIAC-ACT-350; DOT/FAA/CT-TN95/49; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The Federal Aviation Administration (FAA) Technical Center envisions that their studies will require standard measure of pilot/crew performance. Therefore, the FAA commissioned the Crew System Ergonomics Information Analysis Center (CSERIAC) to: (1) identify state-of-the-art pilot(crew performance measures in selected areas of interest, (2) provide guidance material to allow the FAA Technical Center to determine appropriate measures for a given study classification, and (3) provide guidelines on pilot subject characteristics used in their studies. Adhering to accepted standards will allow performance data to be translated between FAA studies and generalized across other government and industry partners. Three areas of human performance that have achieved the most attention in the literature are: workload, situational awareness, and vigilance. An extensive literature search was conducted on each of these areas and leading experts in the human performance research industry were consulted. The tools and techniques used to measure each of these three areas are investigated. Guidelines are provided to assist the human factors practitioner in choosing the most appropriate performance measure for a given study classification (e.g., part-task, full mission, end-to-end). A set of criteria and guidelines on pilot subject characteristics, such as, number of subjects, experience level required, and the we of different airline flightcrews, is also provided.
DTIC
Flight Crews; Human Factors Engineering; Pilot Performance; Cockpit Simulators; Cockpits

19960047304 NASA Ames Research Center, Moffett Field, CA USA
Contingent Attentional Capture ***Final Report***
Remington, Roger, NASA Ames Research Center, USA; Folk, Charles L., Villanova Univ., USA; 1994; 86p; In English
Contract(s)/Grant(s): NCA2-797
Report No.(s): NASA-CR-202055; NAS 1.26:202055; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

Four experiments address the degree of top-down selectivity in attention capture by feature singletons through manipulations of the spatial relationship and featural similarity of target and distractor singletons in a modified spatial cuing paradigm. Contrary to previous studies, all four experiments show that when searching for a singleton target, an irrelevant featural singleton captures attention only when defined by the same feature value as the target. Experiments 2, 3, and 4 provide a potential explanation for this empirical discrepancy by showing that irrelevant singletons can produce distraction effects that are independent of shifts of spatial attention. The results further support the notion that attentional capture is contingent on top-down attention control settings but indicates that such settings can be instantiated at the level of feature values.
Author
Analogies; Visual Signals; Cues; Information Transfer; Perceptual Errors; Visual Stimuli; Cognition; Information Processing (Biology); Color Vision

19960047376 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
The Relationship between Environmental Attitudes and Environmental Behaviors among Air Force Members
Holt, Daniel T., Air Force Inst. of Tech., USA; Dec. 1995; 148p; In English
Report No.(s): AD-A305390; AFIT/GEE/ENV/95D-06; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

A questionnaire was distributed to nearly 2,000 randomly selected active duty Air Force members assigned to locations throughout the continental United States. The survey was designed to determine the extent to which Air Force members expressed support for environmental issues. In addition, the survey measured how frequently Air Force members engaged in specific behaviors that were deemed environmentally protective. Although the Air Force members expressed relatively strong support for environmental issues, they only ocCASIonally engaged in activities that contribute to the preservation or protection of the environment. Correlation analysis revealed that the pro-environmental attitudes were positively linked to the environmentally protective behaviors measured. However, the relationships were only moderate.
DTIC
Surveys; Behavior; Hazards; Military Psychology

19960047531 Wisconsin Univ., Madison, WI USA
Psychophysical Evaluation of Three-Dimensional Auditory Displays ***Annual Report, 1 May 1994 - 30 Apr. 1995***
Wightman, Frederic L., Principal Investigator, Wisconsin Univ., USA; [Apr. 1995]; 141p; In English
Contract(s)/Grant(s): NCC2-542
Report No.(s): NASA-CR-202118; NAS 1.26:202118; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche

This report describes the process made during the first year of a three-year Cooperative Research Agreement (CRA NCC2-542). The CRA proposed a program of applied of psychophysical research designed to determine the requirements and limitations of three-dimensional (3-D) auditory display systems. These displays present synthesized stimuli to a pilot or virtual workstation operator that evoke auditory images at predetermined positions in space. The images can be either stationary or moving. In previous years. we completed a number of studies that provided data on listeners' abilities to localize stationary sound sources with 3-D displays. The current focus is on the use of 3-D displays in 'natural' listening conditions, which include listeners' head movements, moving sources, multiple sources and 'echoic' sources. The results of our research on two of these topics, the role of head movements and the role of echoes and reflections, were reported in the most recent Semi-Annual Pro-ress Report (Appendix A). In the period since the last Progress Report we have been studying a third topic, the localizability of moving sources. The results of this research are described. The fidelity of a virtual auditory display is critically dependent on precise measurement of the listener''s Head-Related Transfer Functions (HRTFs), which are used to produce the virtual auditory images. We continue to explore methods for improving our HRTF measurement technique. During this reporting period we compared HRTFs measured using our standard open-canal probe tube technique and HRTFs measured with the closed-canal insert microphones from the Crystal River Engineering Snapshot system.
Author
Head Movement; Display Devices; Virtual Reality; Computerized Simulation; Auditory Signals; Auditory Stimuli; Sound Generators

19960047744 University of Southern California, Program in Neuroscience., Los Angeles, CA USA
A Biological Neural Network Analysis of Learning and Memory: The Cerebellum and Sensory Motor Conditioning ***Final Report***
Thompson, Richard F., University of Southern California, USA; Nov. 06, 1995; 23p; In English
Contract(s)/Grant(s): N00014-91-J-1392
Report No.(s): AD-A304568; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This research supported by the Office of Naval Research was focussed on how memories for the learning of skilled sensory-motor behaviors are learned, where they are stored in the brain and how these discoveries inform computational models of learning and information processing. We were able to show that (1) these memories are formed and stored in the cerebellum and (2) that the cerebellar neural networks provide a most useful framework for computational modeling.
DTIC
Cerebellum; Mathematical Models; Sensorimotor Performance; Memory; Learning; Neural Nets; Brain

19960047904 Federal Aviation Administration, Technical Center, Atlantic City, NJ USA
The Influence of Generic Airspace on Air Traffic Controller Performance ***Progress Report, Jul. 1994 - Feb. 1995***
Guttman, J. A., Federal Aviation Administration, USA; Stein, Earl, Federal Aviation Administration, USA; Gromelski, S., Federal Aviation Administration, USA; Nov. 1995; 81p; In English
Report No.(s): AD-A305547; DOT/FAA/CT-TN95/38; No Copyright; Avail: CASI; A05, Hardcopy; A01, Microfiche

The generic sector evaluated in this study was based on a four-corner post operation typically used in many terminal areas in the USA. Arrival aircraft originated from one of four arrival fixes just outside the sector boundaries. These arrival routes can be thought of as spokes of a wheel with the main airport site as the hub. In addition to the main airport, there were three satellite airports that were under radar control. Departure aircraft from the main and satellite airports were sent directly to one of four departure fixes located outside the sector boundaries. Eleven air traffic controllers from the Atlantic City TRACON participated in the study. The experiment was conducted at the Federal Aviation Administration Technical Center's Human Factors laboratory at the Atlantic City Inter-National Airport, New Jersey. The experimental apparatus consisted of a high fidelity air traffic control simulator with voice communication equipment to allow controllers to issue commands to remote simulation pilots. The results showed significantly lower Air Traffic Workload Input Technique (ATWIT) ratings by the last generic run compared to the first generic run on the first-day training runs. Time under control and the distance flown by the aircraft significantly decreased by the last training run. Controller ratings of workload and stress were also significantly lower by the last generic run. in addition, post-scenario questionnaire ratings for ability to plan, exchange information, and prioritize were significantly higher by the last run. Correlations between scores on the generic sector and the Atlantic City sector we're significant for the over-the-shoulder ratings, ATWIT ratings, and post-scenario questionnaire ratings. Final questionnaire comments indicated that the participants thought the generic sector was representative of a typical terminal environment.
DTIC
Air Traffic Controllers (Personnel); Operator Performance; Air Traffic Control; Airspace

19960047910 Naval Health Research Center, San Diego, CA USA

Submarines and 18-hour work shift work schedules

Kelly, Tamsin Lisa, Naval Health Research Center, USA; Grill, Jeffrey T., Naval Health Research Center, USA; Hunt, Phillip D., Naval Health Research Center, USA; Neri, David F., Naval Health Research Center, USA; Feb. 1996; 35p; In English

Report No.(s): AD-A306497; NHRC-96-2; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

Circadian rhythms are fluctuations in physiological and behavioral parameters, cycling at a rate of about once every 24 hr, which are controlled by a biological clock. The endogenous circadian clock has been shown to cycle at a rate (tau) unique to each individual that is generally longer than 24 hr (24.25-25 hr). The most accurate method for determining tau is a laboratory protocol called forced desynchrony. In forced desynchrony, subjects are isolated from time cues and bright light. The sleep-wake schedule is lengthened or shortened to the point that it is physiologically impossible for a person to synchronize with. Under these conditions, circadian rhythm free run at the cycle length of the endogenous clock. The submarine 6-on/i 2-off schedule is very similar to such protocols, requiring subjects to live by an 1 8-hr day under conditions of isolation from bright light. A study of personnel living on this schedule aboard a submarine was completed. Measures included the circadian rhythm of salivary melatonin, sleep logs, actigraphs, and a performance assessment battery (PAB) administered on hand-held computers. Preliminary results from the PAB, the sleep logs, and the actigraphs are presented. Subjects appear to get sufficient sleep and to maintain acceptable performance levels on this work schedule.

DTIC

Circadian Rhythms; Physiology; Submarines; Sleep; Schedules; Rhythm (Biology); Protocol (Computers); Hormones; Isolation

54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19960045884 Krug Life Sciences, Inc., San Antonio, TX USA

A 'Smart' Molecular Sieve Oxygen Concentrator with Continuous Cycle Time Adjustment ***Final Report***

Miller, George W., Krug Life Sciences, Inc., USA; Fenner, Jerold E., Armstrong Lab., USA; Apr. 1996; 23p; In English

Contract(s)/Grant(s): F33615-92-C-0018; AF Proj. 7184

Report No.(s): AD-A307094; AL/CF-TP-1996-0002; No Copyright; Avail: Issuing Activity (Defense Technical Information Center (DTIC)), Microfiche

A 'smart' molecular sieve oxygen concentrator (MSOC) is controlled by a set of computer algorithms. The 'smart' system automatically adjusts concentrator operating parameters to accurately control product oxygen concentration while minimizing bleed air consumption. The purpose of this effort was to determine if concentrator performance could be controlled by computer algorithms which continuously adjust concentrator cycle time. A two-bed laboratory molecular sieve oxygen concentrator was constructed and instrumented. The concentrator was operated at ground level and ambient temperature. Computer algorithms or decision process were developed which allowed the software to control concentrator cycle time. Step changes in product flow from 5 to 40 standard liters/minute were induced by a flow controller. A signal representing the product oxygen concentratio n was produced by a medical gas analyzer and inputted into the computer algorithms. Using continuous cycle time adjustment over a range of 14 to 36 seconds, the 'smart' concentrator maintained the produce oxygen concentration within +2.5% of a desired concentration. The smallest incremental change in cycle time was 0.5 second. The highest observed overshoot in oxygen concentration which occurred during the step changes in product flow was about 12%. Inlet air consumption was reduced by approximately 40% when compared to operation at a constant cycle time. 'Smart' MSOC techniques, such as continuous cycle time adjustment, can significantly improve our ability to control oxygen concentrator performance. An added benefit will be reduced bleed air consumption which results in increased aircraft thrust and fuel economy.

DTIC

Concentrators; Oxygen; Algorithms; Software Engineering; Ambient Temperature; Gas Analysis; Gas Detectors

19960045891 Emory Univ., School of Medicine, Atlanta, GA USA

Connectionist Modeling of Basal Ganglia Motor Circuitry ***Final Report, 1 Dec. 1991 - 30 Sep. 1995***

Alexander, Garrett E., Emory Univ., USA; Jan. 31, 1996; 10p; In English

Contract(s)/Grant(s): N00014-92-J-1132

Report No.(s): AD-A304256; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

Using a self-organizing, topology-preserving, sensorimotor architecture, we developed two types of neural networks that were capable of learning, without supervision, to control a simulated, three-segment robot arm with variable degrees of freedom (3,4 or 6 df). One type was an endpoint or posture-controlling network, and the other was a trajectory controller. The hidden layers in these networks consisted of both 2D and 3D lattices comprising from 729 to 1728 neurons. Through process of trial and error, all networks learned to control the positioning of th end of the robot arm within a 3D

workspace. The workspace was either a hemisphere or a cube centered at the origin of the stimulated limb. When tested after training that ranged from 2000 to 12000 trials, both networks achieved relatively uniform placement accuracy throughout the workspace, the level of accuracy varying directly with the number of processing elements and asymptotically with the duration of training. The number of trials required to achieve maximum accuracy was approximately 5 times the number of neurons in the hidden layers.
DTIC
Neural Nets; Robot Arms; Trajectory Control; Ganglia; End Effectors; Machine Learning

19960045912 Army Aeromedical Research Lab., Fort Rucker, AL USA
Performance assessment of the HGU-84/P navy helicopter pilot helmet ***Final Report***
McEntire, B. J., Army Aeromedical Research Lab., USA; Murphy, Barbara, Army Aeromedical Research Lab., USA; Mozo, Ben, T., Army Aeromedical Research Lab., USA; Jan. 1996; 24p; In English
Contract(s)/Grant(s): 30162787A878
Report No.(s): AD-A304630; USAARL-96-04; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The U.S. Army Aviation and Troop Command (ATCOM), Program Manager for Aviation Life Support Equipment (PM-ALSE), funded USAARL to procure and evaluate the Navy HGU-84/P against the U.S. Army HGU-56/P performance requirements. The performance areas evaluated included: impact protection, weight, center of mass, chinstrap strength, shell tear resistance, dynamic retention, and sound attenuation. Only the center of mass requirement was met by the HGU-84/P configuration. None of the other HGU-56/P requirements were fully met. The helmet performed equally as well as the HGU-56/P in the dynamic retention evaluation.
DTIC
Helmets; Life Support Systems; Protection; Impact Resistance; Dynamic Control

19960045913 Army Aeromedical Research Lab., Fort Rucker, AL USA
Evaluation of an Energy Absorbing Truck Seat for Increased Protection from Landmine Blasts ***Final Report***
Alem, Nabih M., Army Aeromedical Research Lab., USA; Strawn, Gregory D., Army Aeromedical Research Lab., USA; Jan. 1996; 64p; In English
Report No.(s): AD-A304697; USAARL-96-06; No Copyright; Avail: CASI; A04, Hardcopy; A01, Microfiche

Mine blast resistant kits, developed by the Night Vision and Electronic Sensors Directorate (NVESD), are designed to enhance the survivability of the crew of military 5-ton trucks. The kit includes an energy-absorbing (EA) seat which is the focus of this report. A full-scale demonstration mine blast of a 5-ton truck was conducted using the full protection kit and included two anthropomorphic manikins to represent the passenger and driver. Only the passenger manikin was seated in the EA seat, while the driver manikin was seated in a standard seat. This report presents the analysis of test data performed by the U.S. Army Aeromedical Research Laboratory (USAARL). Results show the standard seat produced lumbar (lower back) spine compression of 2159 lbs, a value that exceeds the 1500-lb threshold generally used in spinal injury assessment. On the other hand, the EA prototype seat limited the compression of the lower spine to about 1329 lbs, a value which is below injury thresholds. The report concludes that NVESD mine protection kit reduced upward truck accelerations transmitted to the truck occupants and eliminated head contact injuries, and the EA seat reduced lumbar spine compressive forces by 3S percent to a level below tolerance threshold.
DTIC
Trucks; Safety; Human Factors Engineering; Performance Tests; Seats

19960045926 Massachusetts Inst. of Tech., Research Lab. of Electronics., Cambridge, MA USA
Further Research on Super Auditory Localization for Improved Human-Machine Interfaces ***Final Report, 1 Jun. 1994 - 31 Jan. 1996***
Durlach, Nathaniel, Massachusetts Inst. of Tech., USA; Mar. 15, 1996; 26p; In English
Contract(s)/Grant(s): F49620-94-1-0236
Report No.(s): AD-A306267; AFOSR-TR-96-0154; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The general objectives of our initial work on Super Auditory Localization were to determine, understand, and model the perceptual effects of altered localization cues. We had initially intended to conduct this work using a virtual-environment (VE) system for visual as well as auditory stimulation, and to include examination of a wide variety of transformations (rotations, scalings, filterings, asymmetries, exponentiations). As will be seen in the following discussion, we have made substantial progress towards our general objectives. However, our work was conducted using a hybrid VE in which the acoustical simulation was virtual but the visual simulation was real, we focused on only one family of azimuthal transformations, and we made no effort to measure our own Head Related Transfer Functions (HRTFs). The decision to use available HRTFs rather than to construct our own was based on the realization that, at least for our purposes, such work would have a relatively low payoff-to-effort ratio compared to other work that needed to he done.
DTIC
Man Machine Systems; Sound Localization; Auditory Perception; Virtual Reality; Acoustic Simulation; Physiological Responses

19960047103 California Univ., Dept. of Cognitive Science., San Diego, CA USA

The Integrated Mode Management Interface ***Final Report***

Hutchins, Edwin, California Univ., USA; Jun. 1996; 204p; In English

Contract(s)/Grant(s): NCC2-591

Report No.(s): NASA-CR-202220; NAS 1.26:202220; No Copyright; Avail: CASI; A10, Hardcopy; A03, Microfiche

Mode management is the processes of understanding the character and consequences of autoflight modes, planning and selecting the engagement, disengagement and transitions between modes, and anticipating automatic mode transitions made by the autoflight system itself. The state of the art is represented by the latest designs produced by each of the major airframe manufacturers, the Boeing 747-400, the Boeing 777, the McDonnell Douglas MD-11, and the Airbus A320/A340 family of airplanes. In these airplanes autoflight modes are selected by manipulating switches on the control panel. The state of the autoflight system is displayed on the flight mode annunciators. The integrated mode management interface (IMMI) is a graphical interface to autoflight mode management systems for aircraft equipped with flight management computer systems (FMCS). The interface consists of a vertical mode manager and a lateral mode manager. Autoflight modes are depicted by icons on a graphical display. Mode selection is accomplished by touching (or mousing) the appropriate icon. The IMMI provides flight crews with an integrated interface to autoflight systems for aircraft equipped with flight management computer systems (FMCS). The current version is modeled on the Boeing glass-cockpit airplanes (747-400, 757/767). It runs on the SGI Indigo workstation. A working prototype of this graphics-based crew interface to the autoflight mode management tasks of glass cockpit airplanes has been installed in the Advanced Concepts Flight Simulator of the CSSRF of NASA Ames Research Center. This IMMI replaces the devices in FMCS equipped airplanes currently known as mode control panel (Boeing), flight guidance control panel (McDonnell Douglas), and flight control unit (Airbus). It also augments the functions of the flight mode annunciators. All glass cockpit airplanes are sufficiently similar that the IMMI could be tailored to the mode management system of any modern cockpit. The IMMI does not replace the functions of the FMCS control and display unit. The purpose of the INMI is to provide flight crews with a shared medium in which they can assess the state of the autoflight system, take control actions on it, reason about its behavior, and communicate with each other about its behavior. The design is intended to increase mode awareness and provide a better interface to autoflight mode management. This report describes the IMMI, the methods that were used in designing and developing it, and the theory underlying the design and development processes.

Author

Automatic Flight Control; Flight Management Systems; Boeing 747 Aircraft

19960047274 Physics and Electronics Lab. TNO, The Hague, Netherlands

Functional Specifications for a Battlefield Management System for the Light Reconnaissance Vehicle ***Functionele specificatie voor een 'Battlefield Management System' voor het lichte verkennings- en bewakingsvoertuig***

Bot, A., Physics and Electronics Lab. TNO, Netherlands; dHuy, C. W., Physics and Electronics Lab. TNO, Netherlands; Krekel, P. F. C., Physics and Electronics Lab. TNO, Netherlands; vanderLee, M. D. E., Physics and Electronics Lab. TNO, Netherlands; vanLeeuwen, E. W. A., Physics and Electronics Lab. TNO, Netherlands; Lewis, C. J., Physics and Electronics Lab. TNO, Netherlands; Essens, P. J. M. D., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; Oudenhuijzen, A. J. K., Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, Netherlands; May 1996; 176p; In Dutch

Contract(s)/Grant(s): A96KL678

Report No.(s): TNO-FEL-96-A086; TD96-0076; Copyright; Avail: Issuing Activity (TNO Physics and Electronics Lab., P.O. Box 96864, 2509 JG The Hague, Netherlands), Hard–copy, Microfiche

This report contains the fundamental design specifications for the Battlefield Management System of the new light reconnaissance vehicle (LVB) of the Royal Netherlands Army. Specifically, the functions of the BMS, the feasibility of achieving these functions, the relation or the new BMS to other (interNational) systems, the implications of placing the new BMS in the LVB, and the ergonomic aspects of the BMS are all covered.

CASI

Functional Design Specifications; Design Analysis; Management Systems; Human Factors Engineering; Command and Control

19960047403 Civil Aeromedical Inst., Federal Aviation Administration., Oklahoma City, OK USA

Performance of a Continuous Flow Passenger Oxygen Mask at an Altitude of 40,000 Feet ***Final Report***

Garner, Robert P., Civil Aeromedical Inst., USA; Feb. 1996; 17p; In English

Report No.(s): AD-A305614; FOT/FAA/AM-96/4; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

A redesigned continuous flow passenger oxygen mask was tested for its ability to deliver an adequate supply of oxygen at an altitude of 40,000 feet above sea level. Four male subjects participated in the study. Blood oxygen saturation (SaO2) baseline levels for hypoxic exposure were established for each subject. Immediately prior to high altitude exposure, subjects prebreathed 100% oxygen for two hours through a pressure demand type mask. The hypobaric chamber was then

decompressed to a simulated altitude of 35,000 feet. Subjects switched to the passenger oxygen mask. The initial oxygen flow rate to the passenger mask came from manufacturer production performance test data. Once heart and respiratory rates and SaO2 level stabilized, chamber altitude was increased to 40,000 feet. Descent to ground level was performed in steps of 5,000 feet with SaO2 levels being established for each altitude and recommended oxygen flow. Subjects remained at each test altitude for a minimum of three minutes or until SaO2 levels stabilized. At no point during the testing did SaO2 levels approach baseline levels for hypoxic exposure. This mask design would appear to offer protection from hypoxia resulting from altitude exposure up to 40,000 feet.
DTIC

Oxygen Masks; Respiratory Rate; Oxygen; Continuum Flow; Altitude Simulation; Performance Tests; High Altitude; Heart Rate; Flow Velocity

19960047411 North Dakota State Univ., Fargo, ND USA
Proceedings of the ATB Model Users Group Conference
Feb. 09, 1996; 154p; In English; Articulated Total Body (ATB) Model Users' Group Conference, 8 - 9 Feb. 1996, Phoenix, AZ, USA; Sponsored by Armstrong Lab., USA
Contract(s)/Grant(s): AF Proj. 7184
Report No.(s): AD-A305617; 19960321-082; No Copyright; Avail: CASI; A08, Hardcopy; A02, Microfiche

The 1996 Articulated Total Body (ATB) Model Users' Group Conference was held at the Quality Inn South Mountain, Phoenix AZ on 8-9 February 1996. This Conference brought together over fifty users of the ATB model and its derivatives (CVS, Cal-3D, and DYNAMAN). The two day conference offered the opportunity to present and exchange the latest ATB modeling techniques and applications. Invited presentations, group discussions, and interactive exercises covered areas such as model features, harness belt modeling, vehicle and aircraft crashworthiness, design applications, and animation techniques. In addition, the newly-elected charter offices of the ATB Users' Group were introduced and committees formed to initiate group activities.
DTIC

Conferences; Human Factors Engineering; Flight Safety; Aircraft Safety

19960047766 Army Aeromedical Research Lab., Fort Rucker, AL USA
Communication earplug and active noise reduction: hearing protection technologies for air warrior *Final Report*
Mason, Kevin T., Army Aeromedical Research Lab., USA; Mazo, Ben T., Army Aeromedical Research Lab., USA; Apr. 1995; 16p; In English
Contract(s)/Grant(s): 30162787A878
Report No.(s): AD-A304622; USAARL-95-26; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The U.S. Army Aeromedical Research Laboratory (USAARL) participated in the development and testing of two emerging hearing protection technologies for Army aircrew members: Communications EarPlug (CEP), and Active Noise Reduction (ANR). Air Warrior is a program to develop the next generation, integrated, aircrew life support, and combat protection ensemble. The CEP or ANR may be part of the Air Warrior hearing protection strategy. This article compares the two technologies for compatibility with the Army aircrew member helmet and aircraft internal communication systems. In their current state of development, CEP provides better hearing protection, speech discrimination, and crash protection, lower weight and cost, and less need to modify existing aircraft systems compared to ANR.
DTIC

Flight Crews; Military Air Facilities; Noise Reduction; Cost Reduction; Aircraft Communication; Speech Recognition; Weight (Mass)

19960047812 Air Force Inst. of Tech., Wright-Patterson AFB, OH USA
Validation of the Articulated Total Body Model Data Set Describing the Large Advanced Dynamic Anthropomorphic Manikin
Hagan, Joel J., Air Force Inst. of Tech., USA; Dec. 1995; 201p; In English
Report No.(s): AD-A305859; AFIT/GAE/ENY/95D-11; No Copyright; Avail: Issuing Activity (Canada Inst. for Scientific and Technical Information (CISTI)), Microfiche

Recent cut-backs in Department of Defense spending have presented a need to augment full-scale ejection seat testing with computer simulation. to this end, the U.S. Air Force's Armstrong Laboratory has developed a data set describing the Advanced Dynamic Anthropomorphic Manikin (ADAM) for use in conjunction with the Articulated Total Body (ATB) model for the purpose of simulating the dynamics of the ADAM during sled track ejections. The purpose of this thesis is to validate the ADAM data set by graphically comparing ADAM joint angular displacements calculated by the ATB model with those measured during ejection seat sled track tests. The tests used for these comparisons are the ADAM/MASE Integration Tests (AMIT) 79E-G2A and 79E-F1. Results of initial comparisons indicate oversimplifications in original joint resistive torque function calculations. These oversimplifications result in excessive joint oscillations as simulated by the ATB model. A certain amount of success in damping these joint oscillations is realized as a result of modifications to these joint resistive torque functions. Overall, the ATB model accurately simulates ADAM motion for the first 400 milliseconds of each simulation. Beyond this time, simulation versus AMIT 79E-Fl test results correlate relatively well. Nonetheless, excessive oscillations in certain joints continue to persist.
DTIC

Computerized Simulation; Defense Program; Human Body; Oscillations; Ejection Seats

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Ruston, LA 71272–0046
(318) 257–4962 Fax: (318) 257–2447

MAINE

UNIV. OF MAINE
Raymond H. Fogler Library
Govt. Documents Dept.
Orono, ME 04469–5729
(207) 581–1673 Fax: (207) 581–1653

MARYLAND

UNIV. OF MARYLAND – COLLEGE PARK
McKeldin Library
Govt. Documents/Maps Unit
College Park, MD 20742
(301) 405–9165 Fax: (301) 314–9416

MASSACHUSETTS

BOSTON PUBLIC LIBRARY
Govt. Documents
666 Boylston Street
Boston, MA 02117–0286
(617) 536–5400, ext. 226
Fax: (617) 536–7758

MICHIGAN

DETROIT PUBLIC LIBRARY
5201 Woodward Avenue
Detroit, MI 48202–4093
(313) 833–1025 Fax: (313) 833–0156

LIBRARY OF MICHIGAN
Govt. Documents Unit
P.O. Box 30007
717 West Allegan Street
Lansing, MI 48909
(517) 373–1300 Fax: (517) 373–3381

MINNESOTA

UNIV. OF MINNESOTA
Govt. Publications
409 Wilson Library
309 19th Avenue South
Minneapolis, MN 55455
(612) 624–5073 Fax: (612) 626–9353

MISSISSIPPI

UNIV. OF MISSISSIPPI
J.D. Williams Library
106 Old Gym Bldg.
University, MS 38677
(601) 232–5857 Fax: (601) 232–7465

MISSOURI

UNIV. OF MISSOURI – COLUMBIA
106B Ellis Library
Govt. Documents Sect.
Columbia, MO 65201–5149
(314) 882–6733 Fax: (314) 882–8044

MONTANA

UNIV. OF MONTANA
Mansfield Library
Documents Division
Missoula, MT 59812–1195
(406) 243–6700 Fax: (406) 243–2060

NEBRASKA

UNIV. OF NEBRASKA – LINCOLN
D.L. Love Memorial Library
Lincoln, NE 68588–0410
(402) 472–2562 Fax: (402) 472–5131

NEVADA

THE UNIV. OF NEVADA LIBRARIES
Business and Govt. Information Center
Reno, NV 89557–0044
(702) 784–6579 Fax: (702) 784–1751

NEW JERSEY

NEWARK PUBLIC LIBRARY
Science Div. – Public Access
P.O. Box 630
Five Washington Street
Newark, NJ 07101–7812
(201) 733–7782 Fax: (201) 733–5648

NEW MEXICO

UNIV. OF NEW MEXICO
General Library
Govt. Information Dept.
Albuquerque, NM 87131–1466
(505) 277–5441 Fax: (505) 277–6019

NEW MEXICO STATE LIBRARY
325 Don Gaspar Avenue
Santa Fe, NM 87503
(505) 827–3824 Fax: (505) 827–3888

NEW YORK

NEW YORK STATE LIBRARY
Cultural Education Center
Documents/Gift & Exchange Section
Empire State Plaza
Albany, NY 12230–0001
(518) 474–5355 Fax: (518) 474–5786

NORTH CAROLINA

UNIV. OF NORTH CAROLINA – CHAPEL HILL
Walter Royal Davis Library
CB 3912, Reference Dept.
Chapel Hill, NC 27514–8890
(919) 962–1151 Fax: (919) 962–4451

NORTH DAKOTA

NORTH DAKOTA STATE UNIV. LIB.
Documents
P.O. Box 5599
Fargo, ND 58105–5599
(701) 237–8886 Fax: (701) 237–7138

UNIV. OF NORTH DAKOTA
Chester Fritz Library
University Station
P.O. Box 9000 – Centennial and University Avenue
Grand Forks, ND 58202–9000
(701) 777–4632 Fax: (701) 777–3319

OHIO

STATE LIBRARY OF OHIO
Documents Dept.
65 South Front Street
Columbus, OH 43215–4163
(614) 644–7051 Fax: (614) 752–9178

OKLAHOMA

OKLAHOMA DEPT. OF LIBRARIES
U.S. Govt. Information Division
200 Northeast 18th Street
Oklahoma City, OK 73105–3298
(405) 521–2502, ext. 253
Fax: (405) 525–7804

OKLAHOMA STATE UNIV.
Edmon Low Library
Stillwater, OK 74078–0375
(405) 744–6546 Fax: (405) 744–5183

OREGON

PORTLAND STATE UNIV.
Branford P. Millar Library
934 Southwest Harrison
Portland, OR 97207–1151
(503) 725–4123 Fax: (503) 725–4524

PENNSYLVANIA

STATE LIBRARY OF PENN.
Govt. Publications Section
116 Walnut & Commonwealth Ave.
Harrisburg, PA 17105–1601
(717) 787–3752 Fax: (717) 783–2070

SOUTH CAROLINA

CLEMSON UNIV.
Robert Muldrow Cooper Library
Public Documents Unit
P.O. Box 343001
Clemson, SC 29634–3001
(803) 656–5174 Fax: (803) 656–3025

UNIV. OF SOUTH CAROLINA
Thomas Cooper Library
Green and Sumter Streets
Columbia, SC 29208
(803) 777–4841 Fax: (803) 777–9503

TENNESSEE

UNIV. OF MEMPHIS LIBRARIES
Govt. Publications Dept.
Memphis, TN 38152–0001
(901) 678–2206 Fax: (901) 678–2511

TEXAS

TEXAS STATE LIBRARY
United States Documents
P.O. Box 12927 – 1201 Brazos
Austin, TX 78701–0001
(512) 463–5455 Fax: (512) 463–5436

TEXAS TECH. UNIV. LIBRARIES
Documents Dept.
Lubbock, TX 79409–0002
(806) 742–2282 Fax: (806) 742–1920

UTAH

UTAH STATE UNIV.
Merrill Library Documents Dept.
Logan, UT 84322–3000
(801) 797–2678 Fax: (801) 797–2677

VIRGINIA

UNIV. OF VIRGINIA
Alderman Library
Govt. Documents
University Ave. & McCormick Rd.
Charlottesville, VA 22903–2498
(804) 824–3133 Fax: (804) 924–4337

WASHINGTON

WASHINGTON STATE LIBRARY
Govt. Publications
P.O. Box 42478
16th and Water Streets
Olympia, WA 98504–2478
(206) 753–4027 Fax: (206) 586–7575

WEST VIRGINIA

WEST VIRGINIA UNIV. LIBRARY
Govt. Documents Section
P.O. Box 6069 – 1549 University Ave.
Morgantown, WV 26506–6069
(304) 293–3051 Fax: (304) 293–6638

WISCONSIN

ST. HIST. SOC. OF WISCONSIN LIBRARY
Govt. Publication Section
816 State Street
Madison, WI 53706
(608) 264–6525 Fax: (608) 264–6520

MILWAUKEE PUBLIC LIBRARY
Documents Division
814 West Wisconsin Avenue
Milwaukee, WI 53233
(414) 286–3073 Fax: (414) 286–8074